

Air Quality Index Exceedances in Iowa: 2005



*Iowa DNR
Ambient Air Monitoring Group*

What is the Air Quality Index (AQI)?

The AQI is number used to report daily air quality. The AQI is computed from real-time air monitoring data and was created to inform of the public of health effects that can occur within a few hours or days after breathing polluted air. EPA has developed the AQI for five pollutants regulated by the Clean Air Act: ground-level ozone (O₃), particulate matter (PM_{2.5} and PM₁₀), carbon monoxide (CO), sulfur dioxide (SO₂), and nitrogen dioxide (NO₂).

AQI Exceedances

When air pollutant concentrations exceed an AQI of 100, EPA classifies the air quality as “Unhealthy for Sensitive Groups”. Pollutant concentrations corresponding to an AQI of 101 are listed below:

Ozone: 85 ppb (8hr average)

PM_{2.5}: 40.5 ug/m³ (24hr average)

PM₁₀: 155 ug/m³ (24hr average)

SO₂: 145 ppb (24hr average)

CO: 9.5 ppm (8hr average)

Values over these levels are AQI exceedances. Additional AQI categories are given in the following table.

Understanding the AQI

Air Quality Index (AQI) Values	Levels of Health Concern	Colors
<i>When the AQI is in this range:</i>	<i>...air quality conditions are:</i>	<i>...as symbolized by this color:</i>
0 to 50	Good	Green
51 to 100	Moderate	Yellow
101 to 150	Unhealthy for Sensitive Groups	Orange
151 to 200	Unhealthy	Red
201 to 300	Very Unhealthy	Purple
301 to 500	Hazardous	Maroon

What is Particulate Matter?

The term “particulate matter” (PM) includes both solid particles and liquid droplets (excluding water droplets) that are found in outdoor air. Particulate matter may be emitted directly into the air or form from pollutants that react in the atmosphere. Small particles tend to pose the greatest health concern because they can be inhaled into and accumulate in the respiratory system.

Particles of less than 10 microns in diameter are referred to as PM10.

Particles of less than 2.5 microns in diameter are referred to as PM2.5.

Sources of PM2.5 include all types of combustion (motor vehicles, power plants, wood burning, etc.) and some industrial processes. Sources of particles that are smaller than PM10 but larger than PM2.5 include crushing or grinding operations, and dust from paved or unpaved roads.

How is Particulate Matter Measured ?

Iowa operates two distinct types of PM samplers. One type collects the aerosol by drawing ambient air through a filter over a 24-hour period. The filters are then returned to an analytical laboratory where they are weighed. This process provides accurate concentrations, but the data is not available to the public until the analytical work is complete, usually about a month after the sampling date. In order to provide more timely information, Iowa operates continuous samplers that measure PM10 and PM2.5 in real-time.

The continuous PM10 samplers used in Iowa have been designated by EPA as equivalent to filter based methods. However, there are currently no continuous PM2.5 samplers designated by EPA as equivalent to filter based methods. EPA encourages use of continuous PM2.5 monitors for reporting the AQI when the data can be shown to be well correlated with the data from filter samplers. This report does not include data from continuous PM2.5 samplers.

Winter Particulate Event

During the seven-day period from January 31 to February 6, 2005, many regions in the eastern-half of the U.S. and southeastern Canada experienced a particle pollution episode, affecting millions of people. While it was not a rare event (based on the particle pollution levels recorded), it was still a major episode because of the duration and number of cities affected. Iowa recorded AQI levels above 100 on several days during this period. Additional information on this event can be found on the EPA AIRNow website at:

<http://www.epa.gov/airnow/particle-event.html>

2005 Air Quality Index Values Over 100

Monitor Type	Site Location	Site Name	Exceedance Date	Conc.	Units	AQI
PM2.5	Des Moines	Polk County Health	1/30/2005	42.9	ug/m3	106
PM2.5	Waterloo	Grout Museum	1/31/2005	53.2	ug/m3	126
PM2.5	Clarion	Clarion-CAFO	1/31/2005	51.7	ug/m3	123
PM2.5	Council Bluffs	Franklin Elementary	1/31/2005	51.7	ug/m3	123
PM2.5	Des Moines	Cornell Elementary	1/31/2005	48.8	ug/m3	117
PM2.5	Clive	Indian Hills Junior High	1/31/2005	48.5	ug/m3	117
PM2.5	Iowa City	Hoover Elementary	1/31/2005	47.6	ug/m3	115
PM2.5	Sioux City	Lowell Elementary	1/31/2005	47.2	ug/m3	114
PM2.5	Des Moines	Polk County Health	1/31/2005	47	ug/m3	114
PM2.5	Cedar Rapids	Army Reserve	1/31/2005	45	ug/m3	110
PM2.5	Montgomery County	Viking Lake State Park	1/31/2005	43.7	ug/m3	107
PM2.5	Emmetsburg	Iowa Lakes College	1/31/2005	40.6	ug/m3	101
PM2.5	Cedar Rapids	Army Reserve	2/1/2005	48.3	ug/m3	116
PM2.5	Des Moines	Polk County Health	2/1/2005	45.9	ug/m3	112

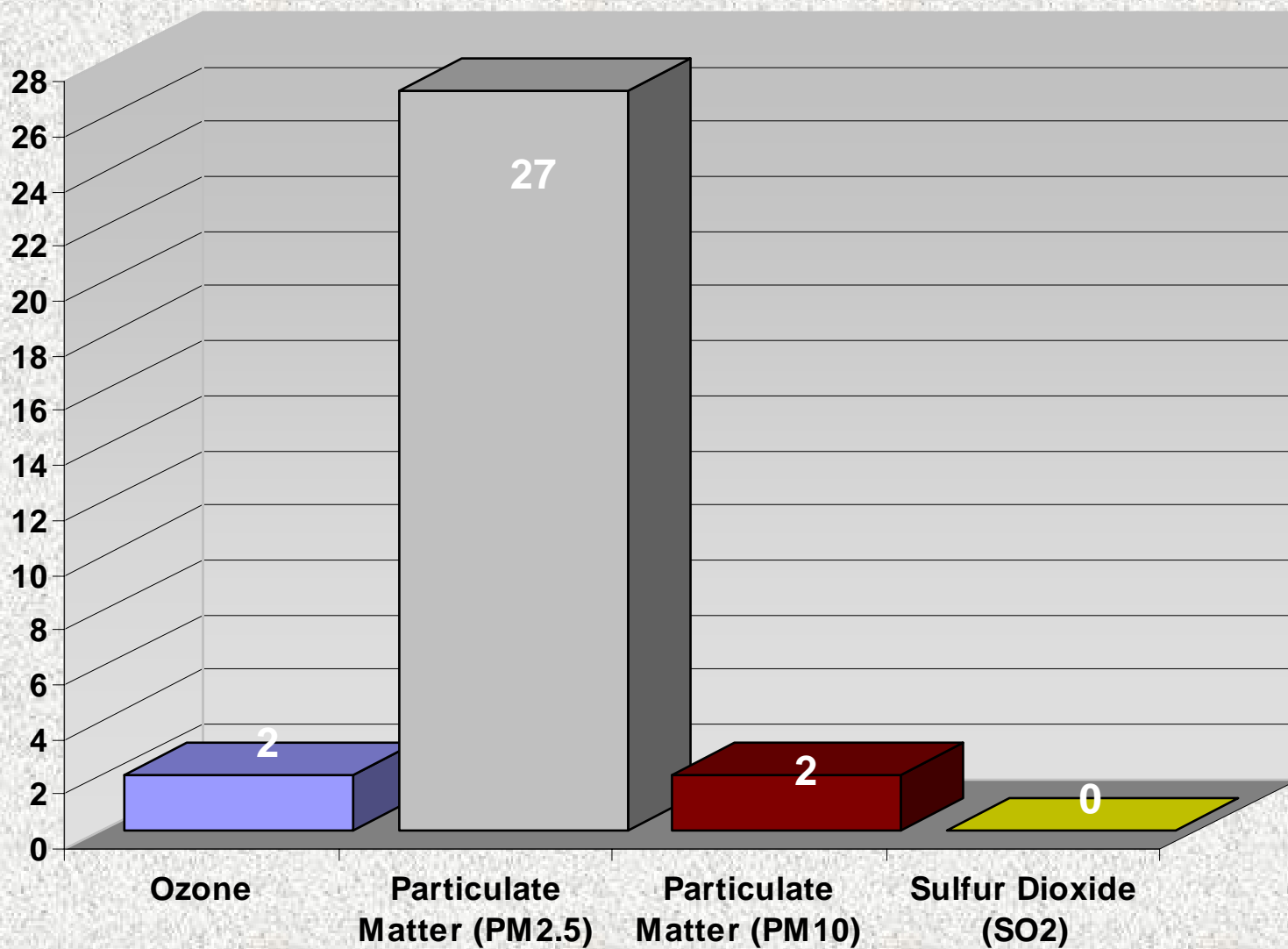
AQI Exceedances: 2005

Monitor Type	Site Location	Site Name	Exceedance Date	Conc.	Units	AQI
PM2.5	Des Moines	Polk County Health	2/2/2005	44	ug/m3	108
PM2.5	Clinton	Rainbow Park	2/3/2005	41.2	ug/m3	102
PM2.5	Iowa City	Hoover Elementary	2/3/2005	41.0	ug/m3	102
PM2.5	Davenport	Black Hawk Foundry	6/27/2005	41.7	ug/m3	103
PM2.5	Iowa City	Hoover Elementary	8/2/2005	41.2	ug/m3	102
PM2.5	Cedar Rapids	Army Reserve	8/2/2005	40.8	ug/m3	102
PM2.5	Clinton	Rainbow Park	8/2/2005	45.3	ug/m3	110
PM2.5	Muscatine	Garfield Elementary	8/2/2005	43.6	ug/m3	107
PM2.5	Davenport	Black Hawk Foundry	8/2/2005	50.5	ug/m3	121
PM2.5	Central Davenport	Adams Elementary	8/2/2005	44.5	ug/m3	109
PM2.5	Central Davenport	Jefferson Elementary	8/2/2005	44	ug/m3	108
PM2.5	Central Davenport	Jefferson Elementary	9/11/2005	40.5	ug/m3	101
PM2.5	Davenport	Black Hawk Foundry	9/13/2005	41.2	ug/m3	102
PM10	Mason City	17th and Washington	1/13/2005	163	ug/m3	105
PM10	Buffalo	Linwood Mining	8/2/2005	164	ug/m3	105
Ozone	Clinton	Rainbow Park	6/24/2005	85	ppb	101
Ozone	Clinton	Rainbow Park	7/11/2005	87	ppb	106

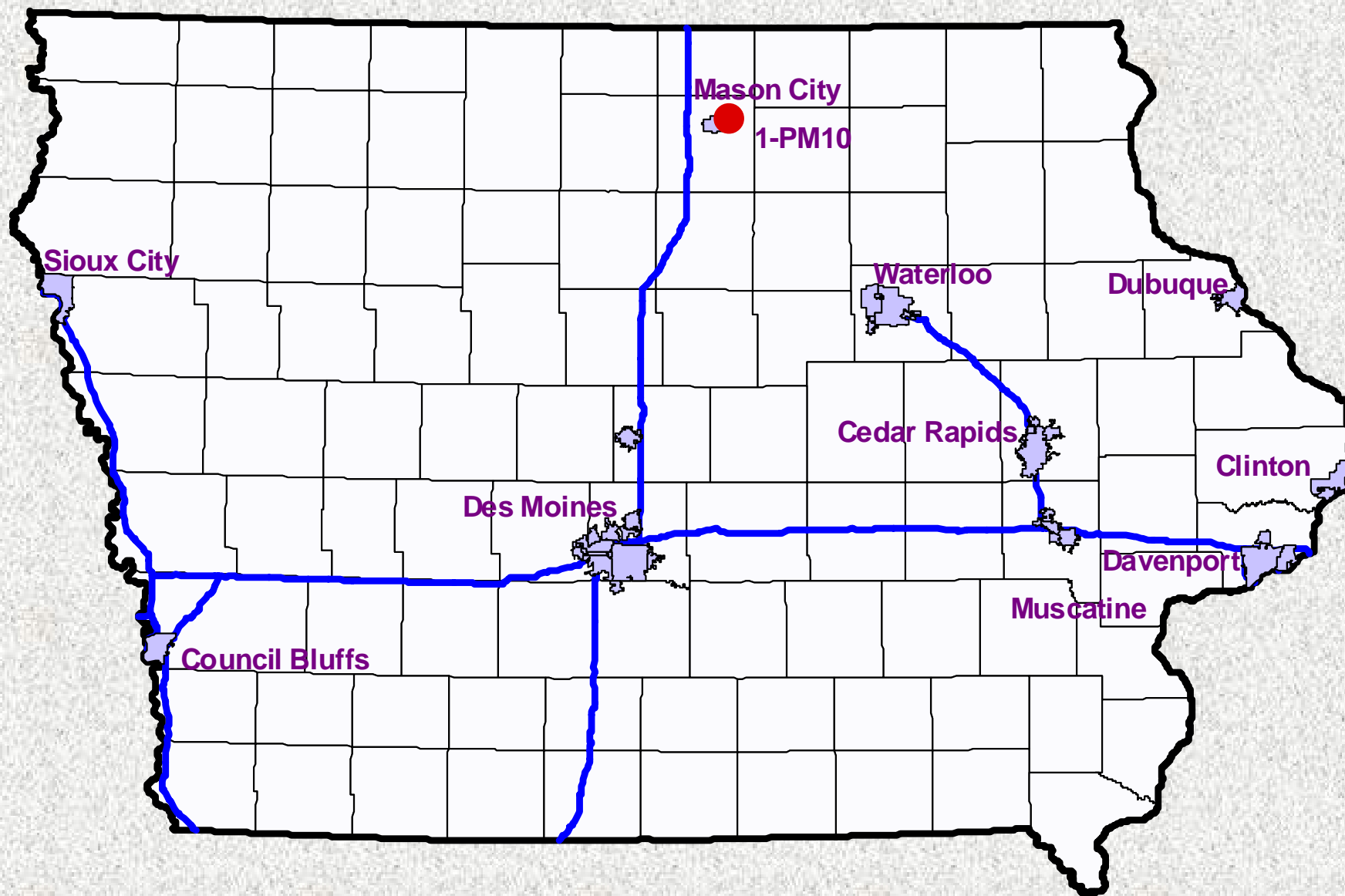
Dates of AQI Exceedances: 2005

Date	PM2.5	PM10	Ozone
1/13/2005		1	
1/30/2005	1		
1/31/2005	11		
2/1/2005	2		
2/2/2005	1		
2/3/2005	2		
6/24/2005			1
6/27/2005	1		
7/11/2005			1
8/2/2005	7	1	
9/11/2005	1		
9/13/2005	1		

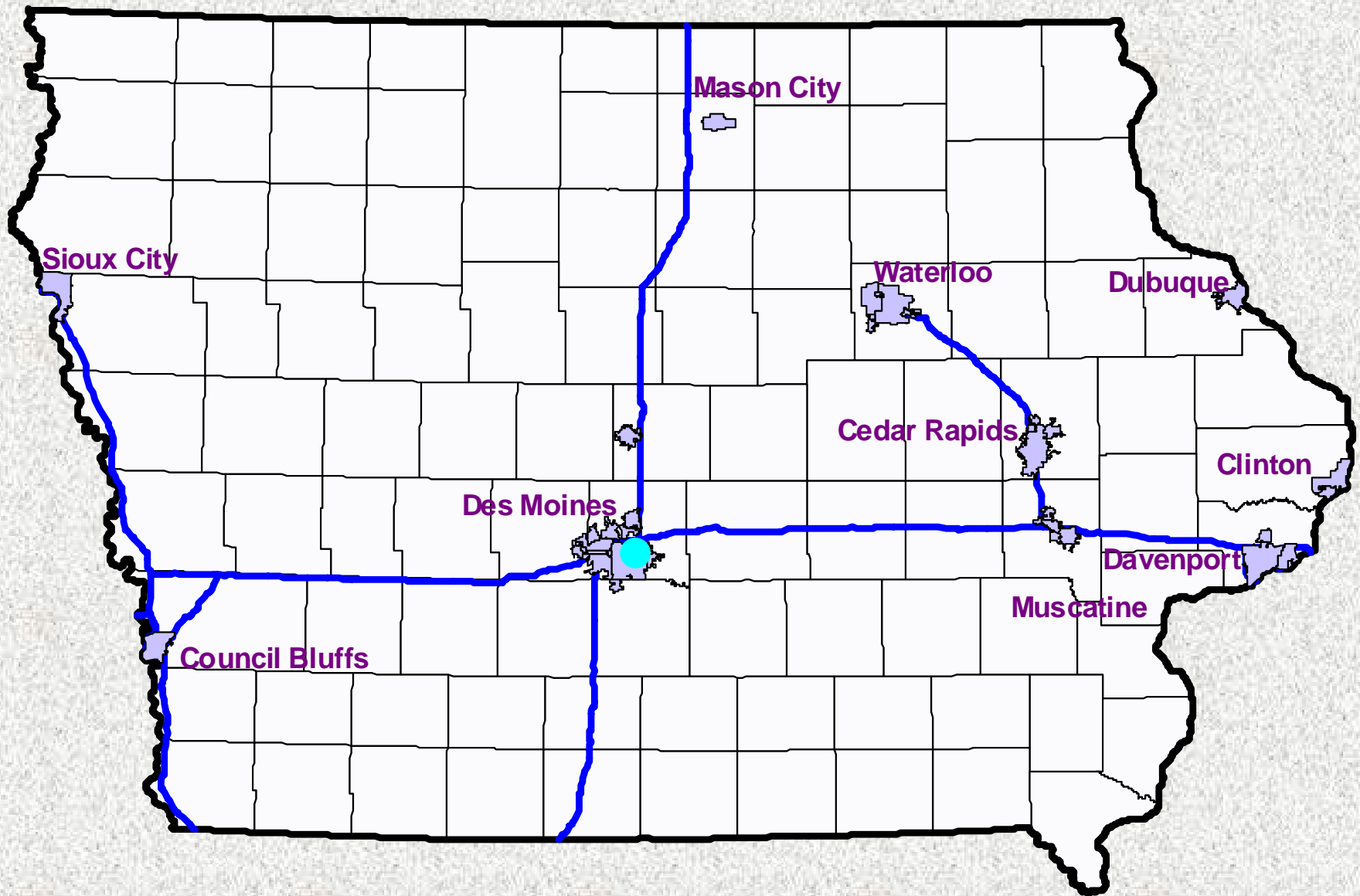
AQI Exceedances by Pollutant: 2005



PM10 Air Quality Index Exceedance 1/13/05

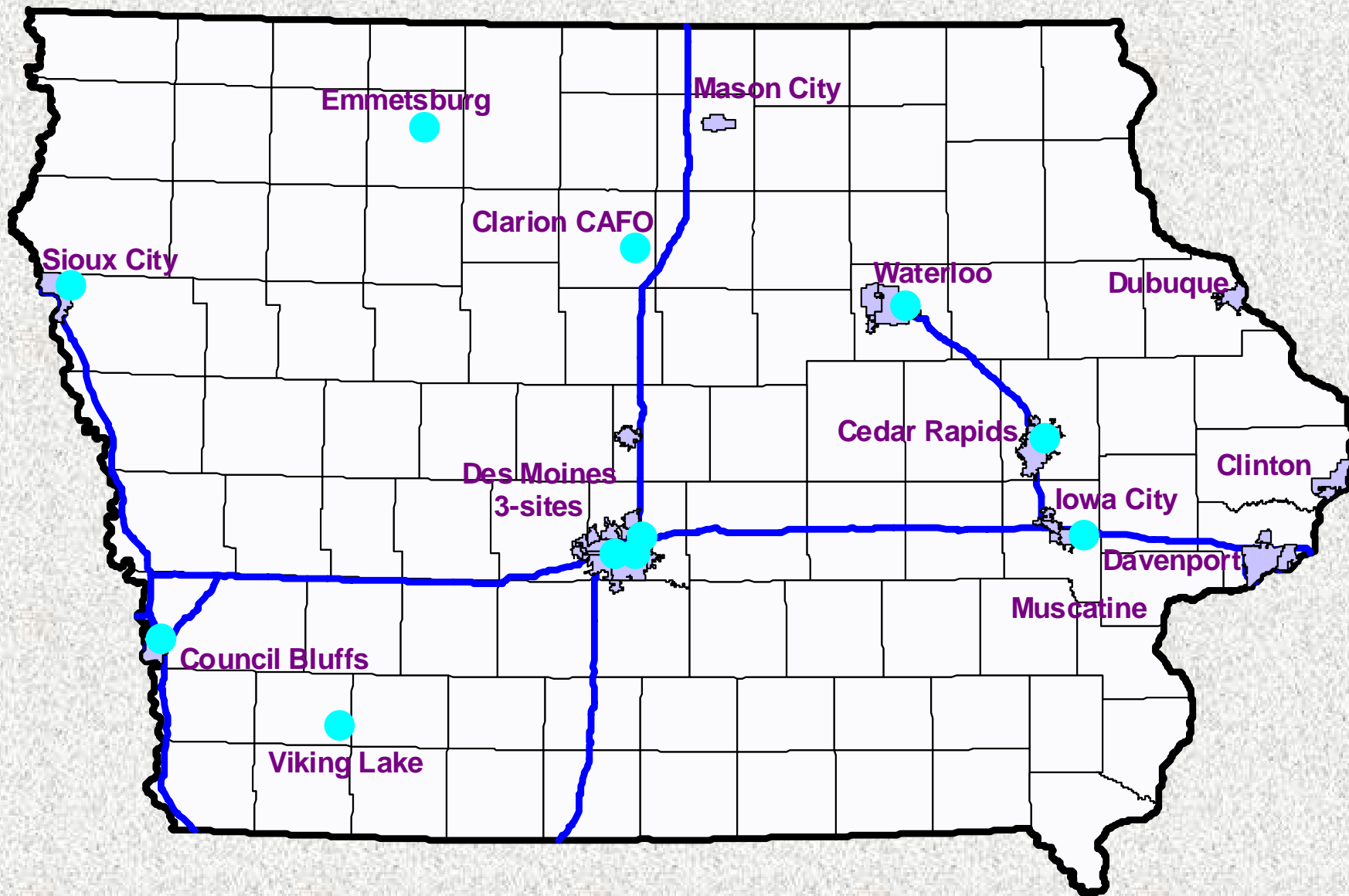


PM2.5 Air Quality Index Exceedance 1/30/05

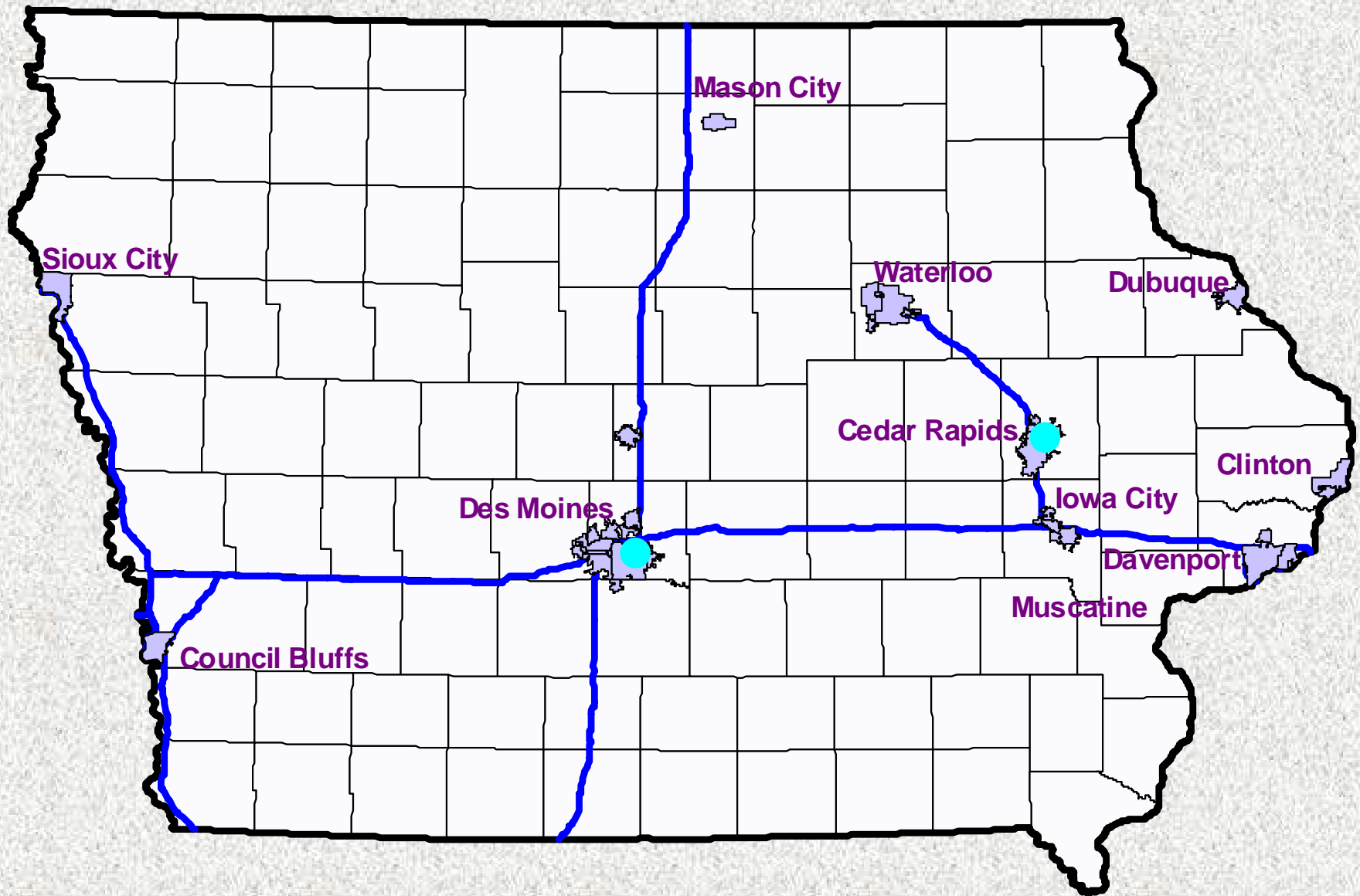


PM2.5 Air Quality Index Exceedances 1/31/05

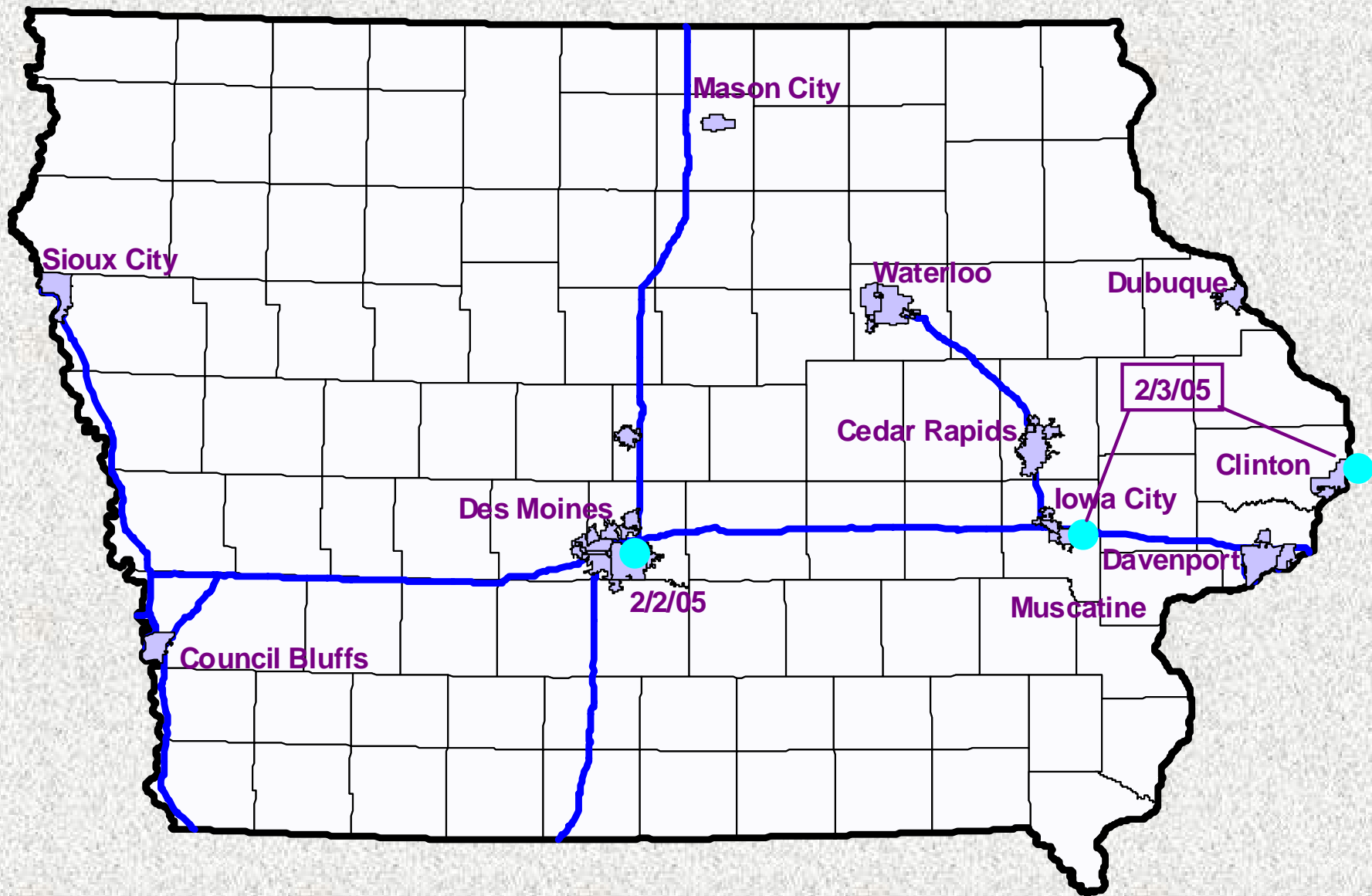
11 sites



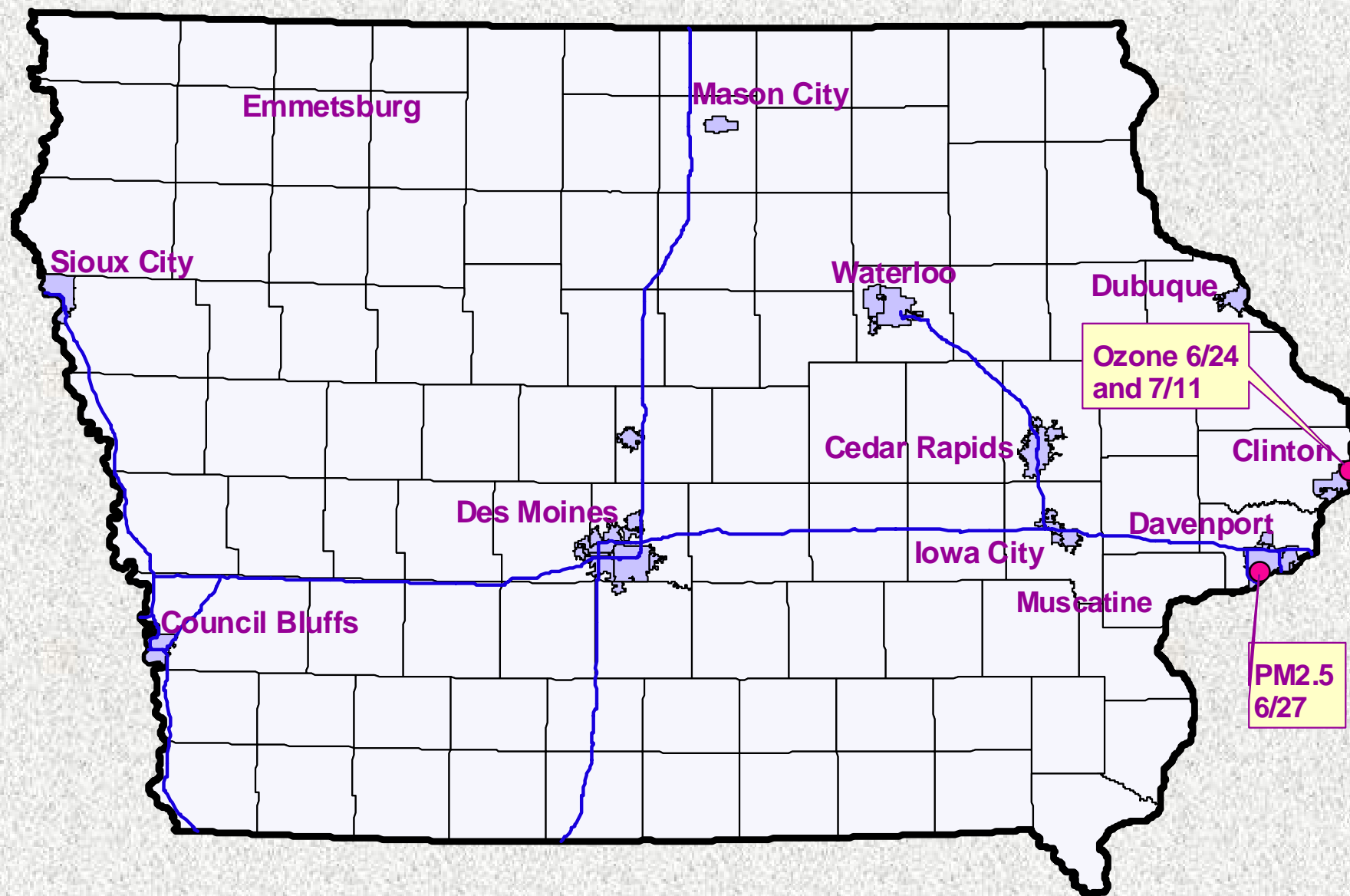
PM2.5 Air Quality Index Exceedances 2/1/05



PM2.5 Air Quality Index Exceedances 2/2/05-2/3/05

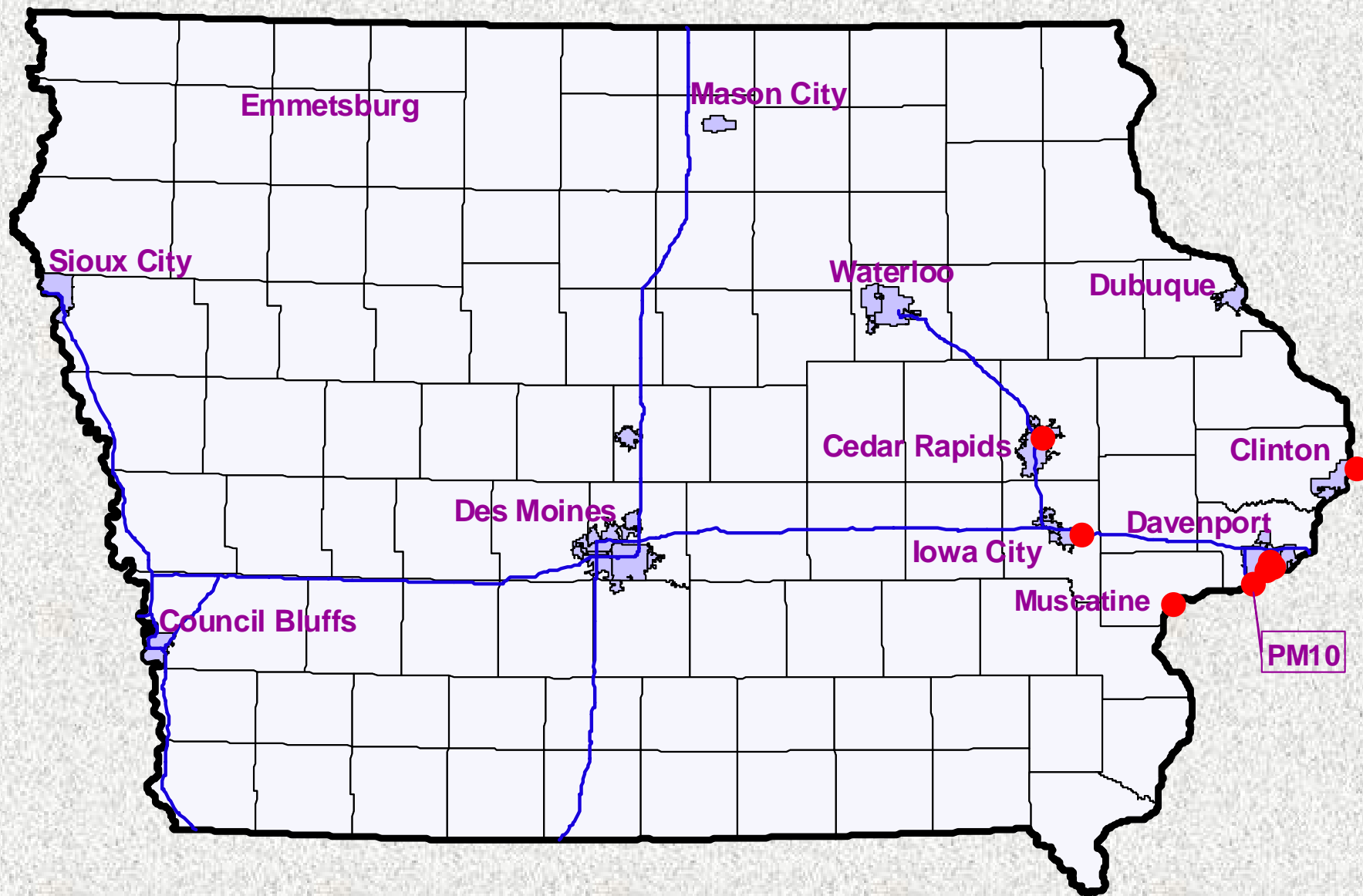


Air Quality Index Exceedances June-July, 2005



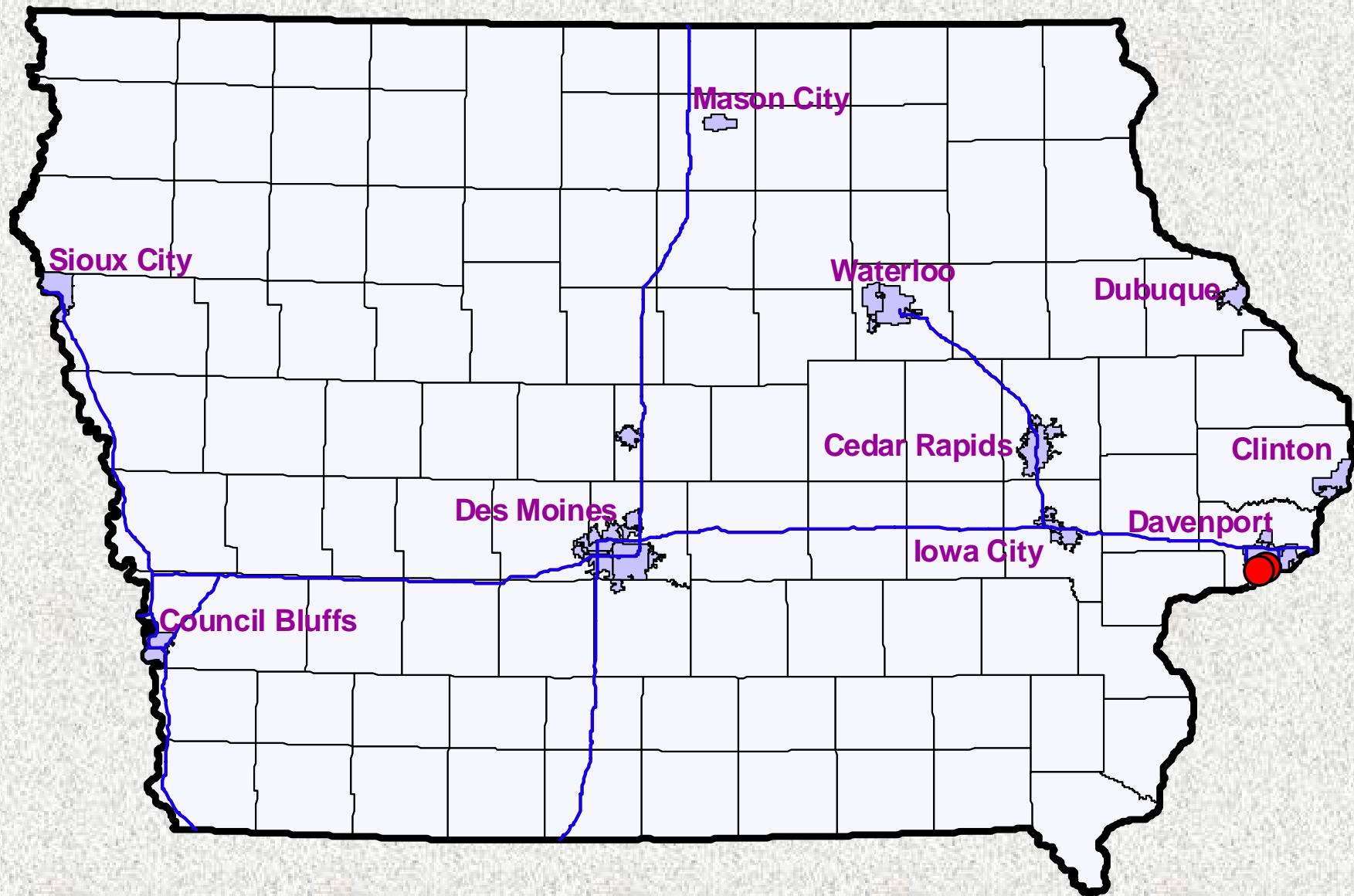
Air Quality Index Exceedances August 2, 2005

(seven PM2.5, one PM10)



Air Quality Index Exceedances September, 2005

(PM2.5 two sites)



Web Resources

Real-time AQI reporting :

In Polk County:

<http://www.airquality.co.polk.ia.us/AQI.asp>

In Linn County:

<http://www.air.linn.ia.us/>

Outside Polk and Linn Counties:

<http://www.uhl.uiowa.edu/services/environment/airquality/ambient/index.html>

Ozone Maps:

<http://www.epa.gov/airnow/index.html>

Historical AQI values for Iowa and Other States:

<http://www.epa.gov/air/data/>